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Williams College
Astrophysics/Bachelors of Arts/June 2012
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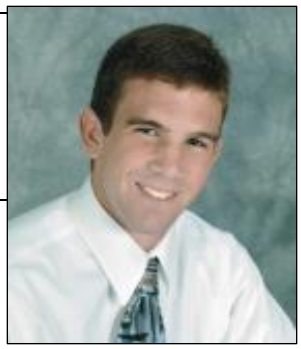
Mentor Org: EV 44, Meteoroid Environment Office



Measurement of the Dust Production of Active Comets

Dust production varies greatly from comet to comet, although the causes of these differences are not well understood. Temporal variations in dust production indicate dynamical changes within the comet nucleus, giving key insight into the evolution of the comet as a whole. We present 2011 and 2012 R-band observations of three active comets known for their unique dust production characteristics: low-activity 49P/Arend-Rigaux, high-activity C/2009 P1 (Garradd), and outburst-prone 29P/Schwassmann-Wachmann. Using narrowband photometry, we measure their dust production in terms of Afρ and examine how it changes with time. Multi-aperture measurements of Afρ also yield qualitative information about the comet's spatial dust profile, and variations in these profiles are studied as well.

Research and Experience

- **Marshall Space Flight Center**, NASA Academy, Summer 2012
  Measured the dust production of active comets 49P/Arend-Rigaux, 29P/Schwassmann-Wachmann, and C/2009 P1 (Garradd) using multi-aperture narrowband photometry, examined how dust production varied with time
- **Williams College**, Honors Thesis, Williamstown, MA (2011-2012)
  Analysis of 123 spatially-resolved spectra of the Eskimo Nebula to examine nebular properties
- **Williams College,** Research Assistant, Williamstown, MA (Summer 2011)
  Analyzed spectra of 16 planetary nebulae in M31 to model properties of central white dwarf stars
- **Williams College**, Research Assistant, Williamstown, MA (January 2011)
  Designed three independent procedures for image reduction and analysis for photometry-based research of Be-class stars
- **Marshall Space Flight Center**, Summer Intern, Summer 2010
  Developed observing and image processing procedures for photometry of asteroids and comets; observed asteroids 664 Judith and (20453) 1999 KL6, measured lightcurves to determine rotational period
- **Wellesley College**, Research Assistant, Wellesley, MA (Summer 2009)
  Measured 2009 lightcurve of asteroid (761) Brendelia, determined sidereal rotational period using lightcurve in combination with lightcurves from several previous years

Memberships and Activities

Sigma Xi Associate Membership (2012)

Honors, Awards

Bachelor of Arts *cum laude*, Thesis Honors, Eagle Scout, Dean's List 7 semesters